REPORT OF SAMPLING OVERSIGHT OBSERVATIONS

ILLINOIS RIVER WATERSHED
OKLAHOMA AND ARKANSAS

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained in June 2006 by Tyson Foods et al. to review documents associated with the Illinois River Watershed (IRW) Sampling Activities, including:

- Camp Dresser and McKee (CDM) Work Plan entitled "Soil and Litter/Manure Sampling Protocol" (CDM Work Plan);
- OSU Cooperative Extension Fact Sheets (Factsheets);
- CDM Standard Operating Procedure entitled "Residential Well Sampling" dated January 9, 2006, revised January 2007 and February 6, 2007;
- CDM Standard Operating Procedure entitled "IRW Groundwater Sampling" dated January 9, 2006, revised January 3, 2007;
- CDM Standard Operating Procedure entitled "Spring Water Sampling" dated June 20, 2005 revised February 5, 2007;
- USEPA Standard Operating Procedures (EPA SOP); and
- Oklahoma Water Resources Board (OWRB) Water Quality Monitoring Program – Field Sampling Protocol for Water Quality Assessments of Streams and Rivers. Draft revised April 27, 2004.

In addition, CRA personnel provided oversight of the field sampling activities conducted by CDM personnel. CDM was assisted by sampling personnel from a firm named Lithochimeia. The business relationship between CDM and Lithochimeia is not known to CRA. Additionally, the employment of the various sampling personnel is not known to CRA. Accordingly, hereafter, in this Report on Sampling Oversight Observations, general reference is made collectively to "CDM" personnel collecting samples.

CRA field observations were compiled in field books, video recordings, photographs, and located using Global Positioning System (GPS) coordinates. A summary of the sampling issues observed by CRA during oversight of CDM's collection of soil, groundwater, surface/spring water and litter samples pursuant to subpoenas and notice in 2006 and 2007 is listed in Table 1. The issues identified in Table 1 occurred on a routine basis and are the most significant and material violations of published standard operating procedures and protocols observed. In addition to the issues listed in Table 1, CRA personnel noted deviations from the above mentioned documents, which are detailed in this report.

Jay Churchill, P. Eng. of CRA has a degree in engineering, and over 20 years of professional experience in engineering, project management, design, and construction oversight of environmental projects throughout North America and in Puerto Rico. Mr. Churchill has collected numerous soil, sediment, surface water, groundwater, concrete core, wipe, sludge, and air samples in accordance with regulatory agency-approved work plans at numerous sites. Mr. Churchill additionally has technical expertise in the agricultural field related to conservation planning, agricultural waste management systems, land treatment practices, nutrient management, and soil and water quality. In recent years, Mr. Churchill has provided project management and technical expertise to CRA's Agricultural Services Group and has been instrumental in the preparation of detailed reports, Comprehensive Nutrient Management Plans, work plans for agri-environmental projects, completion of environmental assessments for agricultural operations, and design review. Mr. Churchill's curriculum vitae is presented in Appendix A.

2.0 ACTIVITIES

2.1 BACKGROUND

The principals of environmental sampling are based on published Standard Operating Procedures and Protocols. The reason the EPA has promulgated procedures and protocols is to provide consistent methods for sample collection, thereby ensuring sample integrity and reliable analytical results. For the purposes of the 2006/2007 IRW sampling activities OSU factsheets, the CDM Work Plan and CDM Standard Operating Procedures (CDM SOPs) provided procedures and protocols for CDM field personnel to follow during sampling activities, including:

- Scope, Overview, and Application of SOPs for Soil, Water, and Litter Sampling;
- Sampling Methods Summary;
- Sampling Procedures for Soil, Water and Litter;
- Sample Containers, Preservation Techniques, Quality Assurance/Quality Control (QA/QC);
- Documentation of Sample Collection and Handling; and
- Reporting of Analytical Data, QA/QC, and Corresponding Field Details.

CRA field personnel observed repeated and material violations of the aforementioned protocols during oversight of the CDM sampling activities. In many instances CRA field personnel observed activities that resulted in direct cross-contamination of samples, presented the potential for unrepresentative analytical results, and showed disregard for established protocols. The manner in which samples were collected would indicate that CDM field personnel lacked the necessary training and experience to conduct the IRW sampling activities. This was evident in the underlying actions and poor adherence to the CDM SOPs.

2.2 OBSERVATIONS OF SOIL SAMPLING ACTIVITIES

During the 2006/2007 IRW sampling activities CRA field personnel observed CDM soil sampling activities on 19 Litter Application Locations (LALs). These LALs are pastures and fields that CDM believe received poultry litter application in the past. The purpose of the sampling is to characterize environmental conditions occurring as a result poultry litter application. The unrepresentativeness of the soil samples with respect to poultry constituents is a concern with many of the LALs selected for soil sampling, due to the presence of cow manure in the fields.

In addition to the repeated and material issues identified in Table 1, CRA field personnel routinely observed cases where CDM actions were either inconsistent with written protocols or otherwise compromised the integrity of the samples. Observations during soil sampling activities included repeated and material actions which violated SOPs and would have resulted in cross-contamination between discrete sample depths, sample grids, and LALs. The following expand on material issues identified in Table 1:

- Sampling in fields where cow manure was present and sampling in close proximity to cow manure. This is a violation of the OSU Factsheet F-2207 which indicates "do not sample immediately after lime, fertilizer or manure applications because those samples do not reflect true soil fertility";
- Advancing the sample probe directly through cow manure during soil sampling, which would have resulted in cow manure and associated nutrients being introduced directly into the soil samples. This is supported by the fact that significant amounts of organic matter were observed in a number of the soil samples. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination of each subsequent sample until the probe was properly decontaminated;
- Dropping sample equipment in cow manure, resulting in contamination of gloves and sampling equipment prior to collecting soil samples. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cow manure and associated nutrients being introduced into the soil samples;
- Cow manure visible on sample probe prior to sample collection. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cow manure and associated nutrients being introduced into the soil samples;
- Failure to consistently and sufficiently decontaminate field equipment at the start of daily sampling, between grids, or after visible contamination from soil and cow manure. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination of contaminants from residual soils and cow manure between sample locations, sample grids, and composite sample depths;
- The sampling knife was not cleaned between sample locations and depths, and residual soil was routinely visible on the knife prior to sample collection. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in residual amounts of soil material from one sample interval being introduced to soil sample material for another depth interval;
- Stepping in fresh cow manure then on the corner of the sample triangle prior to advancing soil sampling probe. This is a violation of Section III. A. 6. of the CDM

Work Plan. This would result in cow manure and associated nutrients being introduced to the soil sample location and subsequent soil samples;

- Clearing vegetation and organic matter from sample location with nitrile gloved hands introducing surficial soil, vegetation, and organic matter to the gloves and to subsequent soil samples handled with nitrile gloves. This is a violation of Section III. A. 6 and Section III. A. 4. d. of the CDM Work Plan.
- Not changing soiled nitrile gloves between sub-samples after coming into contact with cow manure and shallower soil intervals. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination of the deeper soil samples with nutrients and bacteria from the shallower soil samples;
- Soiled nitrile gloves were not changed between individual sample grids or fields. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination between soil samples and sample grids;
- Touching soil samples directly with soiled nitrile and cotton gloves and non-gloved fingers. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in cross-contamination of the soil sample with material that is present on the gloves;
- CDM personnel placing bare fingers and soiled nitrile gloves inside sample bag. This includes placing sample bag labels on the inside of the sample bags prior to arriving at the site to commence sampling activities. This is a violation of Section III. A. 6. of the CDM Work Plan. This would result in the cross-contamination of the soil sample with material that is present on the gloves or bare fingers;
- Discarding residuals of soil samples directly on top of the location of the subsequent samples which is a violation of Sections III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths;
- Tipping the sample probe to empty all remaining soil into sample bag. This is a violation of Sections III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths;
- The soil probe tip was used to clear vegetation and organic matter the from the sample location prior to driving the sample probe but did not appear to be effective. In other instances vegetation and organic matter were not cleared from the sample location prior to driving the sample probe. At no time was a shovel used to clear vegetation and organic matter which is a violation of Section III. A. 4. d. and Section 3 of Exhibit E of the CDM Work Plan. This would result in the inclusion of vegetation and organic matter in the sample;

- Consistently, not all soil material in the sample probe was removed from the probe when collecting the sample from a 2-inch depth interval using the knife. As sample material from shallower depth intervals was dragged into plastic sample bags from the tip of the sample probe, soil material remaining in the sample probe from the deeper depth intervals also was dragged into the sample bags for the shallower samples, which is a violation of Section III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths;
- Advancing the sample probe deeper than 6 inches and using the same sample knife to remove soils deeper than 6 inches in depth, which is a violation of Section III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths;
- Recovering less than 6 inches of soil in the sample probe but still dividing the sample into three "2-inch" sample depth intervals, which is a violation of Section III. A. 4. b. of the CDM Work Plan. This would result in mixing of soil from different sample depths; and
- Insertion of sample probe tip into sample bag and holding sample bag against sample probe tip during filling of sample bag. Touching of sampling equipment to sample containers would result in sample contamination from nutrients and/or bacteria from different soil depths than the soil depth being collected.

When comparing the above noted actions of CDM field personnel with the aforementioned procedures and protocols, significant concerns arise. By violating generally accepted standards, CDMs actions significantly compromised sample integrity which undermines the representativeness of the analytical results obtained from the soil samples.

2.3 OBSERVATIONS OF GROUNDWATER AND SURFACE/SPRING WATER SAMPLING ACTIVITIES

During the 2006 IRW sampling activities conducted by CDM, CRA field personnel observed the collection of six groundwater samples and four surface/spring water samples pursuant to subpoena and notice. There were no groundwater or surface/spring water sampling activities observed by CRA during 2007. During 2006 sampling activities, CRA field personnel observed cases where CDM actions were either inconsistent with written protocols or were otherwise technically unsound, and which may have resulted in the collection of compromised or unrepresentative samples. The following expand on material issues identified in Table 1:

- Failure to adequately purge groundwater wells, which is a violation of Section 2.0 of the Residential Well Sampling and IRW Groundwater Sampling SOPs which states "Wells should be allowed to fun for fifteen minutes before parameters are recorded and samples collected." This would result in the collection of unrepresentative groundwater samples;
- Collection of groundwater samples directly from a garden hose, a potential source of bacteria and other contaminants, which is a violation of Section 4.1 of the Residential Well Sampling and IRW Groundwater Sampling SOPs. This would result in the collection of unrepresentative groundwater samples;
- Collection of groundwater directly from an un-sterilized spigot, a potential source of bacteria and other contaminants, which is a violation of Section 4.1 of the Residential Well Sampling and IRW Groundwater Sampling SOPs. This would result in the collection of unrepresentative groundwater samples;
- Collection of groundwater and surface/spring water samples in un-sterilized sample containers, a potential source of bacteria and other contaminants, which is a violation of Section 4.1 of the Residential Well Sampling, IRW Groundwater Sampling and Spring Sampling SOPs. This would result in the collection of unrepresentative groundwater samples;
- Collection of geochemical indicator measurements (e.g., temperature, pH, and conductivity) after sample collection, which is a violation of Section 3.0 of the Residential Well Sampling and Spring Sampling SOPs. This would result in fresh groundwater not being sampled;
- Collection of groundwater and spring/surface water samples in unpreserved sample containers and/or without field filtering, which is a violation of Section 4.0 of the Spring Sampling SOP. This would result in the collection of unrepresentative groundwater samples;
- Stirring up sediment by stepping in spring/pond prior to water sample collection and after walking down cow path with visible cow manure on it. This action resulted in suspended sediments, which may have additionally been contaminated with cow manure, being included in the surface/spring water samples, thereby contaminating the samples;
- Stirring up sediment prior to sample collection by allowing peristaltic pump to discharge directly upstream of surface/spring water sample location and in the vicinity of cow manure. This action resulted in the suspended sediments, which may have additionally been contaminated with cow manure, being included in the surface/spring water sample, thereby contaminating the sample;

- Sampling surface/spring water where cattle had been observed standing, and with visual evidence of cow manure prior, to the spring sampling. This would have resulted in collection of unrepresentative and possibly contaminated samples;
- Sampling of spring/pond with significant algae growth and visible cow manure in and around water source, would result in the collection of unrepresentative and possibly contaminated samples; and
- Not decontaminating Yellow Springs Incorporated (YSI) meter (used for collection of geochemical indicator measurements) before placing it in the spring/pond prior to obtain a spring/surface water sample collection. This could result in cross-contamination of water samples.

These technically unsound sampling procedures conducted by CDM undermine the representativeness of the analytical results obtained from both the groundwater and surface/spring water samples.

2.4 OBSERVATIONS OF LITTER SAMPLING ACTIVITIES

During the 2006/2007 IRW sampling activities conducted by CDM, CRA field personnel observed the collection of 17 litter samples pursuant to subpoena and notice. During sampling activities, CRA observed cases where CDM's actions were inconsistent with written protocols. The following expand on material issues identified in Table 1:

- Composite sample not mixed thoroughly, which is a violation of Section 8 of Exhibit E from the CDM Work Plan and OSU Factcheet F-2248 which reads, "Place subsamples in a plastic bucket, and mix thoroughly". This would result in unrepresentative and non-homogenous CDM or split samples;
- CDM personnel placing sampling equipment and fingers inside sample containers. Touching of sampling equipment inside sample containers would result in cross-contamination of samples from nutrients and/or bacteria present on the sampling equipment;
- Sub-samples collected in tracks of the catchers' cage handling machines, resulting in cross-contamination of samples from nutrients and/or bacteria outside the poultry house;
- Inconsistent number of sub-samples collected from each poultry house;
- Inclusion of litter that was dropped on the litter bed, and then picked back up in the composite sample could result in compromised samples;

- Use of a pointed spade for sub-sample collection resulted in a proportionately higher amount of litter material from the upper portion of the litter pack being included in the composite sample, which is a violation of OSU Factsheet F-2248, which states, "Collect the entire depth of the litter.." and Section IV. C. 3. of the CDM Work Plan which states, "All samples from litter areas shall be collected through the full thickness (surface to base) of the litter/manure";
- Inconsistent trimming of litter material on shovel, using a trowel, resulted in inconsistent litter volumes being collected from each sample aliquot in the poultry house. In addition, the trimming also resulted in a proportionately higher amount of litter material from the upper portion of the litter pack being included in the composite sample, as varying amounts of loose material from the lower portion of litter pack would fall from the shovel during the act of trimming;
- Soil (i.e., not litter) from beneath the poultry house included in composite sample violates OSU Factsheet F-2248, which states "….but be careful not to remove soil beneath the litter"; and
- Mixing of litter sample and filling sample jar with hands, which violates Section 1.1 of Exhibit D that states, "Mixing will be accomplished using a disposable, plastic sampling scoop or a decontaminated stainless steel spoon".

During the collection of a number of litter samples, CDM field personnel violated the,, aforementioned procedures and protocols, resulting in unrepresentative or compromised sample results.

2.5 ADDITIONAL OBSERVATIONS

Additional observations made by CRA field personnel during the 2006/2007 IRW sampling activities included repeated and material actions of CDM field personnel which were inconsistent with written protocols, including but not limited to the following:

- Use of multiple soil sample probes with different diameters during sampling activities, which is a violation of Section III. A. 4. c. of the CDM Work Plan. This would result in biased analytical results due to unbalanced portions of soil material being included in the composite samples;
- Decontamination blanks on every LAL were not collected, which is a violation of Section III. A. 5. c. iii of the CDM Work Plan. Accordingly, there is no evidence that CDM's equipment decontamination procedures were sufficient;

- Visible rust present on soil sample probe sampler was not removed prior to the first sampling grid each day. This would result in the introduction of metals into the soil samples and unrepresentative sample results;
- Soil sample collection without use of the sample triangle, which is a violation of Section III. A. 4. of the CDM Work Plan. This would result in biased soil sample locations;
- Soil sample locations in visible ground depressions, under tree canopy, and along heavy use areas, which would result in unrepresentative sample results;
- Dragging of sample probe along ground surface between sub-sample locations and grids, which would result in cross-contamination of the soil samples; and
- Failure to remove manufacturer sticker from shovel used to collect litter samples.

The above actions occurred on a routine basis over the course of CDM's field activities, thereby adding to the significance of concerns with the deviations from the CDM Work Plan.

3.0 CONCLUSIONS

The following conclusions are made based on CRA's observations of CDM's field activities during the 2006/2007 IRW sampling activities and a review of protocols and procedures outlined in the CDM Work Plan, Factsheets, and SOPs:

1. During the collection of samples of soil, groundwater, surface/spring water, and poultry litter by CDM, CRA routinely observed CDM field personnel deviating from CDM's written sampling protocols and procedures, or otherwise collecting samples using technically unsound procedures, which resulted in unrepresentative sample analytical results.
2. CDM field personnel actions during soil sampling allowed for cross-contamination between soil sample locations, sample grids, and composite sample depths.
3. CDM field personnel actions during groundwater and surface/spring water sampling allowed for collection of unrepresentative and contaminated samples.
4. CDM field personnel actions during litter sampling allowed for collection of unrepresentative samples.

All of Which is Respectively Submitted,

CONESTOGA-ROVERS & ASSOCIATES

Jay A. Churchill, P. Eng.

Date: February 6, 2008

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Cow Manure Observed in Field*	*Sample Probe in Bag*	*Improper Decontamination Soil On Sample Probe*	*Soil Visible on Gloves*	*Knife Dirty Prior to Sample Collection*	*Cow Manure in Proximity of Sample Location*	*Sampler Driven Through Cow Manure*	*CDM Staff Stepped on Triangle Corner*	*Sampling Knife Used to Scrape Soil Collected From Deeper Than 6 Inches*	*Nitrile/Non-Nitrile Gloved Fingers in Sample Bag*	*Vegetation in 0-2 Inch Sample*	*Vegetation Scraped From Ground Before Sampling Using Sampler Tip*	*Vegetation Not Scraped Prior to Sampling*	*Vegetation Pulled From 0-2 Inch Sample*	*Vegetation Included in 2-4 Inch Sample*	*Vegetation Included in Sample (Depth Not Noted)*
Bill Anderson Section 30	LAL 5-A	x	20	0	0	0	5	0	0	8	12	0	0	20	1	1	13
Julie Anderson-Chancellor Farm	LAL 5-B	x	20	0	3	1	12	3	0	8	3	2	20	0	8	0	3
Julie Anderson-Chancellor Farm	LAL 5-C	x	18	3	2	0	3	0	1	5	10	0	16	0	1	0	4
Julie Anderson-Chancellor Farm	LAL 5-D	x	19	1	1	3	10	0	0	0	2	1	18	1	11	0	2
Anderson Hen Farm # 41	LAL 6-A	x	20	0	1	2	1	0	0	14	2	2	20	0	4	0	0
Anderson Hen Farm # 41	LAL 6-B	x	18	0	1	5	4	0	0	14	0	0	6	0	3	0	0
Anderson Hen Farm # 41	LAL 6-C	x	19	1	2	1	1	0	0	11	3	0	14	10	6	0	1
Anderson Hen Farm # 41	LAL 6-D	x	20	0	4	10	1	0	0	19	4	6	2	10	7	1	5
Pigeon Family Farm	LAL 7-A	x	16	2	11	1	8	0	14	7	4	0	3	4	20	0	0
Pigeon Family Farm	LAL 7-B	x	16	2	8	1	13	0	11	9	1	1	0	6	20	0	2
Pigeon Family Farm	LAL 7-C	x	18	3	3	1	4	0	0	14	13	0	0	2	20	3	0
Pigeon Family Farm	LAL 7-D	x	16	0	6	2	2	0	0	11	10	0	0	0	20	0	0
Ren Butler Farm	LAL 8-A	x	20	0	0	0	6	0	4	20	10	0	16	20	0	1	5
Ren Butler Farm	LAL 8-B	x	20	1	0	0	4	0	4	17	6	0	20	0	0	0	0
Ren Butler Farm	LAL 8-C	0	20	0	7	0	0	0	13	19	0	0	20	1	2	0	0
Ren Butler Farm	LAL 8-D	x	20	1	11	0	5	0	7	19	0	3	20	0	9	0	2
Reed Farm	LAL 9-A	x	20	2	4	2	15	0	2	19	3	1	4	13	12	0	1
Reed Farm	LAL 9-B	x	19	3	4	1	19	0	2	17	1	2	5	12	8	0	1
Reed Farm	LAL 9-C	x	19	0	3	0	0	0	7	19	5	0	0	13	3	0	0
Reed Farm	LAL 9-D	x	20	0	0	0	0	0	0	15	4	4	20	1	6	0	0
Green Country Farms	LAL 10-A	0	20	8	1	0	0	0	0	20	9	0	19	0	0	0	0
Green Country Farms	LAL 10-B	0	20	4	0	0	0	0	1	20	4	0	18	7	0	0	1
David Wofford Farm	LAL 11-A	x	12	0	1	0	1	0	0	9	4	2	0	13	0	0	6
David Wofford Farm	LAL 11-B	x	20	0	1	0	4	0	0	16	14	3	0	20	5	0	9
David Wofford Farm	LAL 11-C	x	18	0	0	0	6	1	1	14	8	3	0	20	0	0	3
David Wofford Farm	LAL 11-D	0	9	0	0	0	0	0	0	4	2	8	0	20	1	1	6

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Farm Name	*Soil Sample*	*Cow Manure Observed in Field*	*Sample Probe in Bag*	*Improper Decontamination Soil On Sample Probe*	*Soil Visible on Gloves*	*Knife Dirty Prior to Sample Collection*	*Cow Manure in Proximity of Sample Location*	*Sampler Driven Through Cow Manure*	*CDM Staff Stepped on Triangle Corner*	*Sampling Knife Used to Scrape Soil Collected From Deeper Than 6 Inches*	*Nitrile/Non-Nitrile Gloved Fingers in Sample Bag*	*Vegetation in 0-2 Inch Sample*	*Vegetation Scraped From Ground Before Sampling Using Sampler Tip*	*Vegetation Not Scraped Prior to Sampling*	*Vegetation Pulled From 0-2 Inch Sample*	*Vegetation Included in 2-4 Inch Sample*	*Vegetation Included in Sample (Depth Not Noted)*
McGarrah Farms	LAL 12-A	x	20	0	0	0	1	0	0	0	1	3	0	5	0	0	4
McGarrah Farms	LAL 12-B	x	20	0	0	0	0	0	0	0	0	7	0	0	4	0	1
McGarrah Farms	LAL 12-C	0	20	0	0	0	0	0	0	0	0	5	2	4	3	0	1
McGarrah Farms	LAL 12-D	x	8	0	0	0	4	1	0	0	0	6	3	0	7	0	0
Collins Farm	LAL 13-A	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Collins Farm	LAL 13-B	0	1	0	1	0	7	3	0	0	0	2	0	0	1	0	0
Collins Farm	LAL 13-C	x	18	0	2	1	6	0	0	9	2	2	0	0	1	0	6
Collins Farm	LAL 13-D	x	16	1	1	0	0	0	0	1	0	2	0	0	0	0	2
Glen Farm	LAL 14-A	0	3	1	0	0	4	1	0	0	0	1	9	5	20	0	0
Glen Farm	LAL 14-B	0	4	0	0	0	0	0	0	0	0	0	6	6	16	0	0
Glen Farm	LAL 14-C	0	5	0	0	0	0	0	0	0	0	5	3	3	10	1	0
Glen Farm	LAL 14-D	0	4	1	0	0	0	0	0	0	0	5	1	0	6	0	0
2-Saun Farm	LAL 15-A	x	6	0	0	1	11	4	0	0	0	0	0	0	0	0	0
2-Saun Farm	LAL 15-B	x	20	3	0	0	7	2	0	0	0	1	0	0	2	0	0
2-Saun Farm	LAL 15-C	x	8	0	0	0	3	1	0	0	0	1	0	0	2	0	0
2-Saun Farm	LAL 15-D	x	7	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Bill Schwabe Farm	LAL 16-A	0	5	0	0	0	0	0	0	0	0	4	0	0	5	0	4
Bill Schwabe Farm	LAL 16-B	0	4	1	0	0	0	0	0	0	0	16	0	6	4	0	8
Bill Schwabe Farm	LAL 16-C	0	6	0	0	0	0	2	0	0	0	7	0	1	8	0	5
Bill Schwabe Farm	LAL 16-D	0	9	0	0	0	1	0	0	0	0	9	0	1	2	0	5
Woffard Farm (rented)	LAL 17-A	x	16	0	0	0	3	1	0	0	0	5	0	0	3	0	0
Woffard Farm (rented)	LAL 17-B	x	18	4	0	0	3	0	0	0	0	0	0	0	4	0	0
Woffard Farm (rented)	LAL 17-C	x	19	3	1	0	2	0	1	0	0	0	0	0	1	0	1
Woffard Farm (rented)	LAL 17-D	x	20	0	1	0	0	0	0	0	0	0	0	0	4	0	1
Billy Ray Anderson Farm	LAL 18-A	0	20	0	0	0	0	0	10	12	14	11	14	9	7	1	5
Billy Ray Anderson Farm	LAL 18-B	0	20	1	0	0	0	0	17	12	3	14	15	1	2	0	3

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ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Cow Manure Observed in Field*	*Sample Probe in Bag*	*Improper Decontamination Soil On Sample Probe*	*Soil Visible on Gloves*	*Knife Dirty Prior to Sample Collection*	*Cow Manure in Proximity of Sample Location*	*Sampler Driven Through Cow Manure*	*CDM Staff Stepped on Triangle Corner*	*Sampling Knife Used to Scrape Soil Collected From Deeper Than 6 Inches*	*Nitrile/Non-Nitrile Gloved Fingers in Sample Bag*	*Vegetation in 0-2 Inch Sample*	*Vegetation Scraped From Ground Before Sampling Using Sampler Tip*	*Vegetation Not Scraped Prior to Sampling*	*Vegetation Pulled From 0-2 Inch Sample*	*Vegetation Included in 2-4 Inch Sample*	*Vegetation Included in Sample (Depth Not Noted)*
Billy Ray Anderson Farm	LAL 18-C	0	20	0	0	0	0	0	17	12	5	9	7	10	6	0	1
Billy Ray Anderson Farm	LAL 18-D	x	17	0	1	1	0	0	7	14	6	0	5	6	3	0	0
George's Morrison Farm	LAL 19-A	x	15	7	3	4	7	0	7	16	4	5	3	8	3	0	2
George's Morrison Farm	LAL 19-B	x	17	8	0	0	6	0	9	2	0	0	8	1	0	0	0
George's Morrison Farm	LAL 19-C	x	19	6	1	1	4	0	0	11	0	0	11	6	1	0	0
George's Morrison Farm	LAL 19-D	x	19	1	1	1	4	0	0	18	3	0	14	3	1	1	0
Tyson's Old Research Farm	LAL 20-A	x	19	7	0	0	2	0	6	18	2	2	16	0	0	0	0
Tyson's Old Research Farm	LAL 20-B	0	19	0	4	1	0	0	5	17	1	2	17	2	0	0	1
Tyson's Old Research Farm	LAL 20-C	x	20	4	0	0	1	1	1	19	0	0	19	0	3	0	1
Nubbie Farm	LAL 21-A	x	13	0	1	0	1	0	1	17	6	0	5	0	0	0	0
Nubbie Farm	LAL 21-B	x	18	0	1	2	10	1	2	15	11	0	15	0	3	0	0
Nubbie Farm	LAL 21-C	0	20	2	1	0	0	0	3	20	20	2	19	0	3	0	0
Nubbie Farm	LAL 21-D	x	18	0	0	0	1	0	0	18	6	0	4	0	0	0	2
Bill Engleman Farm	LAL 22-A	0	14	0	0	0	0	0	0	19	2	0	4	0	0	0	0
Bill Engleman Farm	LAL 22-B	0	15	0	0	0	0	0	1	19	6	0	2	0	0	0	2
Bill Engleman Farm	LAL 22-C	0	5	0	0	0	0	0	0	16	0	0	0	0	0	0	0
Bill Engleman Farm	LAL 22-D	0	9	0	0	0	0	0	0	20	2	0	1	0	0	0	0
Ricky Reed Farm	LAL 23-A	x	7	1	0	0	6	0	0	20	1	0	5	0	0	0	4
Ricky Reed Farm	LAL 23-B	0	18	0	0	0	0	0	0	19	0	0	0	0	0	0	2
Ricky Reed Farm	LAL 23-C	0	6	0	0	0	0	0	0	16	0	0	0	0	0	0	0
Ricky Reed Farm	LAL 23-D	x	9	1	0	0	0	0	0	18	0	0	2	0	0	0	0

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Post Driver Dropped on Cow Manure*	*Mixing of Sample Depths*	*One Core Collected From Each Sub-Sample Location*	*Two of More Cores Collected From Each Sub-Sample Location*	*Touched Sample With or Without Nitrile Gloves*	*Less Than 6" Recovered, CDM Unclear What Depth Soil is From But Samples Anyway*	*Visible Cow Manure on Sampler Immediately Prior to Sample Collection*
Bill Anderson Section 30	LAL 5-A	2	0	0	20	20	0	0
Julie Anderson-Chancellor Farm	LAL 5-B	0	1	0	20	9	2	0
Julie Anderson-Chancellor Farm	LAL 5-C	0	3	0	20	9	0	0
Julie Anderson-Chancellor Farm	LAL 5-D	0	0	0	20	7	1	0
Anderson Hen Farm # 41	LAL 6-A	0	0	0	20	2	0	0
Anderson Hen Farm # 41	LAL 6-B	0	0	0	20	0	0	0
Anderson Hen Farm # 41	LAL 6-C	0	0	0	20	10	0	0
Anderson Hen Farm # 41	LAL 6-D	0	0	0	20	9	0	0
Pigeon Family Farm	LAL 7-A	0	1	1	19	20	0	0
Pigeon Family Farm	LAL 7-B	1	5	0	20	20	0	0
Pigeon Family Farm	LAL 7-C	0	1	0	20	20	0	0
Pigeon Family Farm	LAL 7-D	0	0	0	20	20	0	0
Ren Butler Farm	LAL 8-A	1	0	0	20	14	0	0
Ren Butler Farm	LAL 8-B	0	0	0	20	20	0	0
Ren Butler Farm	LAL 8-C	0	20	0	20	0	0	0
Ren Butler Farm	LAL 8-D	0	20	0	20	4	0	0
Reed Farm	LAL 9-A	0	2	1	19	7	0	0
Reed Farm	LAL 9-B	0	2	1	19	6	1	1
Reed Farm	LAL 9-C	0	20	20	0	2	0	0
Reed Farm	LAL 9-D	0	0	0	20	20	0	0
Green Country Farms	LAL 10-A	0	0	0	20	4	0	0
Green Country Farms	LAL 10-B	0	0	0	20	11	1	0
David Wofford Farm	LAL 11-A	0	0	0	20	8	0	0
David Wofford Farm	LAL 11-B	1	0	0	20	8	0	0
David Wofford Farm	LAL 11-C	0	0	0	20	7	0	0
David Wofford Farm	LAL 11-D	0	2	0	20	4	1	0

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Post Driver Dropped on Cow Manure*	*Mixing of Sample Depths*	*One Core Collected From Each Sub-Sample Location*	*Two of More Cores Collected From Each Sub-Sample Location*	*Touched Sample With or Without Nitrile Gloves*	*Less Than 6" Recovered, CDM Unclear What Depth Soil is From But Samples Anyway*	*Visible Cow Manure on Sampler Immediately Prior to Sample Collection*
McGarrah Farms	LAL 12-A	0	0	0	20	1	0	0
McGarrah Farms	LAL 12-B	0	0	20	0	0	0	0
McGarrah Farms	LAL 12-C	0	1	20	0	0	0	0
McGarrah Farms	LAL 12-D	1	1	20	0	0	0	0
Collins Farm	LAL 13-A	0	20	20	0	0	0	0
Collins Farm	LAL 13-B	0	0	20	0	1	0	0
Collins Farm	LAL 13-C	0	2	0	20	4	0	0
Collins Farm	LAL 13-D	0	0	20	0	3	0	0
Glen Farm	LAL 14-A	1	0	0	0	2	0	0
Glen Farm	LAL 14-B	0	0	1	19	0	0	0
Glen Farm	LAL 14-C	1	1	0	20	0	0	0
Glen Farm	LAL 14-D	0	6	20	0	0	0	0
2-Saun Farm	LAL 15-A	0	0	20	0	0	0	0
2-Saun Farm	LAL 15-B	0	0	0	20	0	0	0
2-Saun Farm	LAL 15-C	0	0	20	0	2	0	0
2-Saun Farm	LAL 15-D	0	0	15	5	1	0	0
Bill Schwabe Farm	LAL 16-A	0	0	20	0	0	0	0
Bill Schwabe Farm	LAL 16-B	0	0	0	20	4	0	0
Bill Schwabe Farm	LAL 16-C	0	0	20	0	0	0	0
Bill Schwabe Farm	LAL 16-D	0	1	20	0	0	0	1
Woffard Farm (rented)	LAL 17-A	0	0	20	0	0	0	0
Woffard Farm (rented)	LAL 17-B	0	1	20	0	0	0	0
Woffard Farm (rented)	LAL 17-C	0	0	0	20	3	0	0
Woffard Farm (rented)	LAL 17-D	0	0	20	0	0	0	0
Billy Ray Anderson Farm	LAL 18-A	0	0	0	20	15	0	0
Billy Ray Anderson Farm	LAL 18-B	0	1	20	0	9	0	0

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
SOIL SAMPLING

Farm Name	*Soil Sample*	*Post Driver Dropped on Cow Manure*	*Mixing of Sample Depths*	*One Core Collected From Each Sub-Sample Location*	*Two of More Cores Collected From Each Sub-Sample Location*	*Touched Sample With or Without Nitrile Gloves*	*Less Than 6" Recovered, CDM Unclear What Depth Soil is From But Samples Anyway*	*Visible Cow Manure on Sampler Immediately Prior to Sample Collection*
Billy Ray Anderson Farm	LAL 18-C	0	0	20	0	12	0	0
Billy Ray Anderson Farm	LAL 18-D	0	20	20	0	3	0	0
George's Morrison Farm	LAL 19-A	0	12	0	7	6	0	
George's Morrison Farm	LAL 19-B	2	16	0	0	4	0	
George's Morrison Farm	LAL 19-C	0	2	0	0	0	0	
George's Morrison Farm	LAL 19-D	0	5	0	0	1	0	
Tyson's Old Research Farm	LAL 20-A	0	7	1	0	4	0	
Tyson's Old Research Farm	LAL 20-B	0	8	0	1	7	1	
Tyson's Old Research Farm	LAL 20-C	0	2	0	1	3	0	
Nubbie Farm	LAL 21-A	1	1	0	0	5	0	
Nubbie Farm	LAL 21-B	0	1	0	0	14	0	
Nubbie Farm	LAL 21-C	0	2	0	0	15	0	
Nubbie Farm	LAL 21-D	0	0	0	0	0	0	
Bill Engleman Farm	LAL 22-A	0	0	0	0	5	0	
Bill Engleman Farm	LAL 22-B	0	1	0	0	1	1	
Bill Engleman Farm	LAL 22-C	0	0	0	0	0	0	
Bill Engleman Farm	LAL 22-D	0	0	0	0	4	0	
Ricky Reed Farm	LAL 23-A	0	0	0	0	0	0	
Ricky Reed Farm	LAL 23-B	0	0	0	0	0	0	
Ricky Reed Farm	LAL 23-C	0	0	0	0	1	0	
Ricky Reed Farm	LAL 23-D	0	0	0	0	1	0	

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
WATER SAMPLING

Farm Name	*Water Sample*	*Groundwater Sample Collected Immediately Without Purging*	*Groundwater Sample Collected Directly From Garden Hose*	*Groundwater Sample Collected Directly From Spigot Without Sterilization*	*Pump Used to Sample Spring Discharges Upstream of Spring*	*Cattle in Spring*	*Use of Un-Sterilized Bottles for Bacteria Samples*	*YSI Meter Not Sterilized Prior to Dipping in Spring*	*CDM Using Un-Preserved Bottles*	*CDM Stepped in Spring After Walking Down Path With Cow Manure and Stir up Sediment Upstream of Sample Location*
McGarrah Farms	GW-…-001									
Bill Anderson Section	SW-…-001				x	x	x	x		
Collins Farm	GW-…-002								x	
2-Saun Farm	SW-…-003					x				x
2-Saun Farm	GW-…-004	* purged for 5-10min	x							
Glen Farm	GW-…-005	* purged for 15min		x						
Bill Schwabe Farm	GW-…-006	x								
Bill Schwabe Farm	GW-…-007	x	x							
Bill Schwabe Farm	SW-…-008				x					
Bill Schwabe Farm	SW-…-009					x				

TABLE 1

LIST OF FIELD ISSUES OBSERVED 2006 - 2007
ILLINOIS RIVER WATERSHED
LITTER SAMPLING

Farm Name	*Litter Sample*	*Sample Not Mixed Thoroughly*	*Number of Samples Against Wall*	*Number of Samples Under Feeders*	*Number of Samples Under Water Line*	*Number of Samples in Middle*	*Total Sub-Samples Collected*	*CDM Personnel with Fingers in Sample Container*	*Sub-Samples Collected in Tracks of Cage Handling Machine*	*Sample Dropped on Poultry House Floor was Retrieved and Included in Composite*	*Full Litter Depth Not Recovered in Sub-Samples*	*Part of House Dirt Floor Collected in Composite*	*Two Samples From Same Sub-Sample Location*	*Inconsistent Sub-Sample Due to Trimming of Litter*	*Mix Sample and Fill Jar with Hands*
Pigeon Family Farm	FAC-01	x					22				x				x
Loftin Farm	FAC-02	x	6	4	4	3	17	x			x			x	x
Reed Farm	FAC-03						18		x						
2-Saun Farm	FAC-04	x					18				x				
Glen Farm	FAC-05		4	4	4	4	16		x						
Green Country Farms	FAC-06		7	5	4	2	18			3 times	x	x			
McGarrah Farms	FAC-07	x	6	6	4	2		x	x		x			x	
Bob Schwabe Farm	FAC-08		8	4	3	3	18	x			x	x	x		
Billy Ray Anderson - Sect 30	FAC-09		3	7	6	2	18	x			x				
Julie Anderson-Chancellor	FAC-10		3	7	4	2	16	x							
George's Morrison Farm	FAC-11	x						x			x			x	
Nubbie Farm	FAC-12	x						x	x		x			x	
O'Leary Farm	FAC-13	x						x	x		x			x	
Masters Turkey House	FAC-14	x						x			x			x	
Butler Tyson Green Valley Complex 9	FAC-15	x						x	x		x			x	
Ricky Reed Farm	FAC-16	x						x			x				
Butler Tyson Green Valley Complex 12	FAC-17	x						x			x				

APPENDIX A

CURRICULUM VITAE - JAY CHURCHILL, P. ENG.

JAY A. CHURCHILL, P. Eng.

EDUCATION

B.Sc.(Eng.)	University of Guelph, Water Resources Engineering, 1985
Other Courses:	Conservation Planning, Part 2 (Modules 6-8) USDA-NRCS, October 2006
	Comprehensive Nutrient Management Plan Development Course, Iowa State University, Dept. of Agricultural and Biosystems Engineering, November 2005
	Conservation Planning, Part 1(Modules 1-5) - USDA-NRCS, February 2005
	Michigan/EPA Asbestos Building Inspector, Initial Training Course, Jensen Environmental Training Services, Detroit, Michigan, November 2001
	Conducting Comprehensive Environmental Property Assessments, Department of Engineering Professional Development, University of Wisconsin – Extension, May 1993
	Understanding Remediation, Department of Engineering Professional Development, University of Wisconsin – Extension, March 1990
	40-hour OSHA HAZWOPER training course (1987) and annual 8-hour refresher courses complying with 29 CFR 1910.120
	CNMP Element Writer Certification for Manure and Wastewater Handling and Storage, Iowa State University, Dept. of Agriculture and Biosystems Engineering, September 2007
	CNMP Element Writer Certification for Land Treatment Practices, Iowa State University, Dept. of Agriculture and Biosystems Engineering, September 2007
	CNMP Element Writer Certification for Nutrient Management - courses in progress

EMPLOYMENT

1993-Present	Project Manager Conestoga-Rovers & Associates
1990-92	Project Coordinator, Conestoga-Rovers & Associates
1986-90	Project Engineer, Conestoga-Rovers & Associates
1985-86	Junior Engineer, Totten Sims Hubicki Associates
1985	Environmental Technician, Ontario Ministry of the Environment

AFFILIATIONS

Association of Professional Engineers of Ontario

CURRENT POSITION WITH CRA

- Project Manager/Senior Engineer:
  - Responsible for management of all aspects of environmental and agricultural engineering projects, including investigations and assessments; environmental and civil construction; remediation, contract management; cost management; and invoicing to Clients

- Provides project management and technical assistance in CRA Agricultural Services Group. Prepares Comprehensive Nutrient Management Plans (CNMPs); prepares work plans for agricultural engineering work, including conducting environmental assessments and identification of agricultural best management practices; conducts environmental assessments; and provides technical oversight of agricultural environmental investigation being conducted by a third party
- Ensures engineering projects are completed in a technically sound manner
- Coordinates effective interaction of various engineering and scientific groups and disciplines, such as engineering, agricultural services, hydrogeology, chemistry, and technical support, to promote successful project completion. Reviews work product of various groups to ensure project goals are achieved
- Arranges for the availability of appropriate personnel and resources
- Responsible for communication with regulatory agencies, client, and the project team

PROFILE OF PROFESSIONAL ACTIVITIES

- *Agricultural Services*
  - managed the completion of environmental assessments and identification of best management practices (BMPs) for surface water and groundwater protection at >200 swine facilities in North Carolina. Developed detailed priority ranking system for BMP implementation, which ensures BMPs will be implemented in an order which achieves maximum environmental benefits in the most cost effective manner. Prepared detailed BMP recommendation report
  - prepared Comprehensive Nutrient Management Plans (CNMP) for several dairy and beef farms in Wisconsin
  - researched and prepared report on Regulatory Foresight for the Biofuel Industry
  - engineering QA oversight of HDPE liner installation for 10-acre agricultural waste storage pond in Oklahoma
  - received CNMP Element Writer certification for Manure and Wastewater Handling and Storage, Iowa State University
  - received CNMP Element Writer certification for Land Treatment Practices, Iowa State University
  - received certification for Conservation Planning, Parts 1 and 2, from United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS)
  - through course work and attending training programs, working towards achieving full certification with USDA-NRCS as a Technical Services Provider and certified CNMP Planner
- ***Design and Project Management of Remedial Construction***
  - Doepke-Holliday Superfund Site, Johnson County, Kansas (Superfund Site)
    - designed an impermeable multi-layer cap (synthetic liner and drainage net, soil, vegetative cover) over 35-acre site with significant grades
    - managed remedial construction activities associated with impermeable cap construction
    - currently managing long-term groundwater monitoring program, operation and maintenance (O&M) program, and associated USEPA reporting requirements
  - Former PCB Capacitor Manufacturing Plant, Indiana (USEPA and IDEM Site)
    - designed and managed remedial measures for the multi-phase cleanup of PCB-contaminated soils, creek sediments and concrete. Remedial measures included extensive soil excavation (60,000 c.y.); sequenced creek water diversion and sediment excavation; synthetic liner installations; PCB-capacitor segregation and packaging; concrete demolition; extensive

shoring installation; building dismantling and reconstruction; off-site disposal of PCB-contaminated soils and sediments; and surface restoration

- Closure of Numerous Solid Waste Disposal Areas
  - designed remedial measures including excavation of solid wastes and codisposed soil; segregation of wastes from codisposed soil; segregation and off-site disposal or recycling of waste materials by waste type; backfilling of segregated soil; and surface restoration activities
  - managed remedial construction activities
  - Specific examples of key solid waste disposal area closure projects completed include:
    1. Lakeside Memorial Park, Miami, Florida, U.S.A. (100,000 c.y. of solid waste and soil) (1998 – 1999)
    2. Camposanto De Cristo Rescucitado, Ponce, Puerto Rico, U.S.A. (55,000 c.y. of solid waste and soil) (1997 - 1998)
    3. El Senorial Memorial Park, Rio Piedras, Puerto Rico, U.S.A. (5,700 c.y. of solid waste and soil) (1997)
    4. Spring Hill Cemetery, Nashville, Tennessee, U.S.A. (2,100 c.y. of solid waste and soil) (2003)
    5. Semper Concrete, Butler, Pennsylvania, U.S.A. (5,600 c.y. of solid waste and soil) (1998)
    6. Hillcrest Memorial Gardens, Cleveland, Tennessee U.S.A. (12,000 c.y. of solid waste and soil) (2000)
    7. Valley of the Temples Memorial Park, Kaneohe, Oahu, Hawaii (8,700 c.y. of solid waste and soil) (1999)
- Industrial Plant, Buffalo, New York (NYSDEC Site)
  - designed an asphalt cap cover system and vegetated soil cover system over an active industrial site
  - managed remedial construction activities
- Asbestos Abatement (Numerous Sites in Canada)
  - prepared asbestos abatement specifications, some abatement to be completed in conjunction with facility renovation or demolition, and managed abatement projects
  - prepared asbestos management plans (AMPs) for asbestos to remain in place
- Industrial Plant, Wisconsin (WDNR Site)
  - managed remedial activities conducted at a former manufactured gas plant site with coal tar contamination, including groundwater interceptor drain construction; construction of a steel sheet pile groundwater barrier wall; and construction of a groundwater pump and treatment system
- CIW Site, Romulus, Michigan (USEPA Site)
  - managed remedial activities conducted at a former oil recycling facility, including PCB-contaminated oil removal; sludge solidification and removal; tank demolition; and drummed waste repackaging and securement operations

- ***Nature and Extent of Contamination Investigations***
  - Former PCB Capacitor Manufacturing Plant, Indiana (USEPA and IDEM Site)
    - conducted an extensive PCB surface and subsurface soil and sediment sampling program; groundwater and surface water investigations; concrete coring; wipe sampling; and PCB air sampling
  - CIW Site, Romulus, Michigan (USEPA Site)

  - drum sampling in a Level B work environment; tanked liquids sampling at this former oil recycling facility contaminated with PCBs
- Chemical Manufacturing Site, Charles City, Iowa
  - lagoon sludge sampling
- Numerous Underground Storage Tank (UST) Sites in the United States and Canada
  - confirmatory soil sampling and groundwater investigations for UST closures

- ***Technical Review and Comment/Negotiation of Agency Orders/Consent Decrees/Remedial Actions***
  - Doepke-Holliday Superfund Site, Johnson County, Kansas (Superfund Site)
    - Consent Decree
  - CIW Site, Romulus, Michigan (USEPA Site)
    - CERCLA 106 Order
  - Shavers Farm Site, Walker County, Georgia (USEPA Site)
    - Removal Action completed by USEPA
  - Novak Farm Site, New York (NYSDEC Site)
    - Removal Action completed by NYSDEC

- ***Expert Testimony***
  - Doepke-Holliday Superfund Site, Johnson County, Kansas (Superfund Site)
    - participated in mediation sessions with client, remedial contractors, and judge to resolve large remedial construction contract settlement dispute

- ***Cost Allocation in Support of Negotiations/Settlements***
  - CIW Site, Romulus, Michigan (USEPA Site)
    - evaluated costs incurred by client for remedial work required to be completed under a CERCLA 106 Order issued by USEPA, and assisted in preparation of client claim for reimbursement from USEPA
  - Shavers Farm Site, Walker County, Georgia (USEPA Site)
    - critically evaluated USEPA expenditures associated with a large Removal Action completed by USEPA for which USEPA was seeking reimbursement from client
  - Novak Farm Site, New York (NYSDEC Site)
    - critically evaluated NYSDEC expenditures associated with a large Removal Action completed by NYSDEC for which NYSDEC was seeking reimbursement from client
  - Large Energy Company (U.S.)
    - conducted a detailed evaluation of actual and potential environmental liabilities associated with in excess of 1,000 active and former energy company facilities

- ***Miscellaneous Technical Work***
  - highly skilled in construction contract technical interpretation, enforcement, and administration
  - prepared many contract documents and specifications for various investigative and remedial programs
  - prepared work plans for hazardous waste and solid waste remedial and investigative programs

- prepared detailed engineering reports and environmental sampling and analyses reports for numerous hazardous waste and solid waste remedial construction projects, for submission to government agencies and industry
- prepared detailed cost estimates for remedial programs and environmental monitoring programs, under multiple scenarios and cost expenditure time frames
- prepared Environmental Indicator Determination (Current Human Exposures Under Control, and Migration of Contaminated Groundwater Under Control) documents meeting the requirements of USEPA's RCRA program
- prepared Health and Safety Plans for hazardous waste investigative and remedial programs
- prepared Spill Prevention Control and Countermeasure Plans (SPCCPs) and Stormwater Pollution Prevention Plan (SPPP)
- evaluated chemical composition of soils, groundwater, surface water, and waste materials, based on environmental and regulatory criteria
- designed an explosive gas monitoring system for a sanitary landfill

• ***Key Field Remedial Construction and Related Experience***

- supervised extensive remedial cleanup activities of PCB-contaminated soils, creek sediments and concrete. Remedial measures included extensive soil and sediment excavation (60,000 c.y.) and off-site disposal; sequenced creek water diversion and sediment excavation; synthetic liner installations; PCB-capacitor segregation and packaging; concrete demolition; extensive shoring installation to accommodate excavation to depth of 18 feet; building dismantling and reconstruction; and surface restoration
- supervised PCB-transformer decontamination and removal operations; PCB-contaminated soil removal; removal of tanked PCB-contaminated oils; PCB-capacitor packaging and removal; storage tank dismantling; and building demolition
- provided technical assistance and oversight during drum and contaminated soil excavation activities at a large drummed waste disposal site
- supervised segregation of hazardous liquid and solid chemicals in a supplied air modified "Level A" work environment within a former metal plating facility
- coordinated drum securement, sampling, waste classification, and drum removal operations at several sites
- supervised concrete coring operations inside a PCB-contaminated active plant facility
- supervised regrading operations and the construction of an impervious clay cover over an industrial landfill
- collected numerous soil, sediment, surface water, groundwater, concrete core, wipe, sludge, and air samples at numerous hazardous waste sites in the United States and Canada

• ***Other Training and Unique Experience***

- former CRA internal Quality System (ISO 9001) auditor
- considerable experience in the installation and testing of synthetic liner systems
- experience in sheet pile installation for hydraulic containment and structural support
- experience in angle borings for subsurface soil sampling beneath structures
- completed Red Cross emergency first aid training and CPR courses